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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.                | CONFIRMATION NO. |
|---|-------------|----------------------|------------------------------------|------------------|
| 10/719,182  | 11/20/2003  | Kamal Jain           | MS1-1658US                         | 3223             |
| 22801   | 7590        | 08/29/2007           |                                    |                  |
| LEE & HAYES PLLC<br>421 W RIVERSIDE AVENUE SUITE 500<br>SPOKANE, WA 99201 |             |                      | EXAMINER<br>BIAGINI, CHRISTOPHER D |                  |
|   |             |                      | ART UNIT                           | PAPER NUMBER     |
|   |             |                      | 2142                               |                  |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/719,182.

Applicant(s)

JAIN ET AL.

Examiner

Christopher D. Biagini

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 101***

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 1-3, 5-11, 13-19, and 21-27 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

3. Claims 1-3, 5-11, 13-19, and 21-27 are directed toward an algorithm and the programming of a general-purpose computer to implement the algorithm. The claimed steps simply manipulate abstract ideas and lack a claimed practical application. Note that "[m]erely claiming nonfunctional descriptive material, i.e., abstract ideas, stored on a computer-readable medium, in a computer, or on an electromagnetic carrier signal, does not make it statutory." See MPEP § 2106.01 and § 2106.02.

### ***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 5, 13, and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. The claims are unclear because they require  $x_0$  to represent both the number of Steiner trees “not used to shortcut any path” and “used to shortcut a path.” For the purposes of this examination, the claim will be interpreted to require that  $x_0$  represents the Steiner trees used to shortcut a path.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 5-11, 13-19, and 21-27 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Jain et al. (“Packing Steiner Trees,” hereinafter “Jain”).

3. The Examiner notes that the differences between the disclosure of the instant application and the content of the cited paper appear to be largely legal boilerplate designed to place the subject matter more firmly in the technological arts.

4. Regarding claim 1, Jain shows a method comprising:

- a. generating a set of Steiner trees and paths from an undirected graph of vertices representing terminal and Steiner nodes (see paragraph 2 of introduction and section 2, “Preliminaries”); and
- b. merging the Steiner trees and the paths to produce linked and edge-disjoint S-Steiner trees such that if a subset S of the vertices is k-edge-

connected, then there are  $\alpha_{|S|}k$  edge-disjoint Steiner trees for  $S$ , where  $\alpha_s$  is at minimum a sequence that tends to an asymptotic approximation factor of  $|S|/4$  as  $S$  tends to infinity (see paragraphs 1-11 of section 3, "The Algorithm").

5. Regarding claim 2, Jain shows the limitations of claim 1 as applied above and further shows wherein generating further comprises analyzing an undirected graph of vertices representing terminal and Steiner nodes to produce a Steiner tree between two terminal nodes of the terminal nodes, the two terminal nodes now being processed nodes (see paragraphs 1 and 2 of the "Proof Sketch" for Theorem 3.2).

6. Regarding claim 3, Jain shows the limitations of claim 2 as applied above and further shows wherein generating further comprises:

- a. for each unprocessed vertex of the vertices, identifying one or more respective paths from the unprocessed vertex to each of a set of processed terminal vertices of the vertices to inductively grow the undirected graph by creating the Steiner trees, the unprocessed vertex now being a processed vertex;
- b. for each unprocessed vertex of the vertices, identifying one or more respective paths from the unprocessed vertex to each of a set of processed terminal vertices of the vertices to inductively grow the undirected graph by creating the Steiner trees, the unprocessed vertex now being a processed vertex;
- and
- c. for each Steiner tree:

- i. determining if a path of the paths shares an edge with the Steiner tree; and
- ii. responsive to determining that the path shares the edge, shortcutting the path to a vertex of the Steiner tree by removing a portion of the path that is subsequent to the edge, each Steiner tree being used to shortcut a path of the paths being a path-tree.

6. See "Proof Sketch" for Theorem 3.2.

7. Regarding claim 5, Jain shows the limitations of claim 1 as applied above, and further shows wherein the substantially  $\alpha_{|S|}k$  edge-disjoint Steiner trees for S are at minimum the following:

$$SOL_p(x) = x_0 + x_p - \left\lceil \left( x_0 - \sum_{i=p+1}^s ix_i \right) / p \right\rceil + \sum_{i=1}^{p-1} x_i = \left\lfloor \frac{p-1}{p} x_0 + \sum_{i=1}^p x_i + \sum_{i=p+1}^s \frac{i}{p} x_i \right\rfloor,$$

8. wherein  $x_0$  represents the Steiner trees not used to shortcut any path.

9. See equation 3.4.

10. Regarding claim 6, Jain shows the limitations of claim 5 as applied above, and further shows wherein  $p$  is a number such that  $\sum_{i=p+1}^s ix_i < x_0 \leq \sum_{i=p}^s ix_i$ .

11. Regarding claim 7, Jain shows the limitations of claim 5 as applied above, and further shows wherein if  $x_0 \leq sx_s$ ,  $p = s$ . See the second full paragraph on page 5.

12. Regarding claim 8, Jain shows the limitations of claim 5 as applied above, and

further shows wherein if  $\sum_{i=1}^s ix_i < x_0$ ,  $p = 0$ .

13. Claims 9-11, 13-19, and 21-27 correspond to claims 1-8, and are rejected for the same reasons as applied above.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 4, 12, 20, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jain ("Packing Steiner Trees") in view of Wall et al. (US PG PUB 2003/0037160, hereinafter "Wall").

3. Jain shows the limitations of claims 1, 9, 17, and 25 as described above, and further shows wherein the vertices represent respective sending, receiving, and router network nodes (see paragraph 2 of section 1, "Introduction"), and wherein the method further comprises:

- a. identifying one or more of the edge-disjoint Steiner trees that comprise each of a subset of nodes (necessary in order to associate movie streams with Steiner trees); and

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- b. multicasting the streaming data to a subset of nodes over communication pathways identified by one or more of the edge-disjoint Steiner trees (note that "each stream of movie is broadcasted via a Steiner tree").
4. Jain does not explicitly show receiving a set of requests for streaming data from at least a subset of vertices of  $S$ , the at least a subset representing receiving network nodes.
5. Wall shows receiving a set of requests for streaming data from network nodes (see [0023] and [0025]). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Jain with the streaming data requests taught by Wall in order to allow clients to choose when to receive streaming data.

### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
7. The document "Publications and Manuscripts" shows that the publication "Packing Steiner Trees" was publicly available at least as of August 27, 2002.
8. The document "Combinatorics Seminar Series" shows that a seminar on the topic of "Packing Steiner Trees" was given by Mohammad Salavatipour on November 15, 2002.
9. The document "The Steiner tree packing problem in VLSI design" describes the application of Steiner trees to the design of electrical circuits.



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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher D. Biagini whose telephone number is (571) 272-9743. The examiner can normally be reached on M-R 7:30-5, 7:30-4 alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Caldwell can be reached on (571) 272-3868. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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